EXHIBIT A

MACMILLAN DICTIONARY OF IMMUNOLOGY

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First published 1989 by
THE MACMILLAN PRESS LTD.
London and Basingstoke

Associated companies in Auckland, Delhi, Dublin, Gaborone, Hamburg, Harare, Hong Kong, Johannesburg, Kuala Lumpur, Lagos, Manzini, Melbourne, Mexico City, Nairobi, New York, Singapore, Tokyo.

British Library Cataloguing in Publication Data

Rosen, F.
Dictionary of immunology.
1. Immunology — Dictionaries
I. Title II. Steiner L. III. Unanue, Emil R.
574.2'9'0321 QR180.4

ISBN 0-333-34742-0
ISBN 0-333-39248-5 Pbk

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Printed in Great Britain

compatibility molecules on the thymic stromal cells. *Synonym for* linked recognition.

mid-piece. Obsolete term for the COMPLEMENT components found in the EUGLOBULIN fraction of SERUM. It is now known that this fraction contains all of the C1, no C2, and some of the remaining complement components. *See* END-PIECE.

migration inhibitory factor (MIF). LYMPHOKINE that inhibits the movement of MONOCYTES and MACROPHAGES. A test for MIF is carried out by placing a capillary tube containing macrophages, usually from peritoneal exudates, in a culture dish. During incubation, the macrophages move out of the tube, and the extent of migration can be estimated by measuring the area occupied by the cells. Addition of a culture supernatant from activated T LYMPHOCYTES, containing MIF, reduces the area of migration usually by 25–75 percent. INTERFERON-GAMMA has MIF activity, but it is not clear whether there are additional proteins with this property. The MIF test became popular as a test to measure CELL-MEDIATED IMMUNITY, but it has largely been superseded by more direct and quantitative assays. The biological significance of MIF is not known; perhaps it serves to minimize the migration of cells out of areas of immune reactivity.

minor histocompatibility antigen. Transplantation antigen that is not encoded in the major histocompatibility locus (*see* MINOR HISTOCOMPATIBILITY LOCUS). Each minor histocompatibility antigen plays a weak role in GRAFT REJECTION, but since there are many such antigens (~50), their aggregate effect may be considerable. *See* H-Y, SKIN SPECIFIC HISTOCOMPATIBILITY ANTIGEN.

minor histocompatibility locus. Genetic locus encoding an antigen that provokes a relatively weak immunological response to grafts. The response is weak compared to the response to antigens encoded by the MAJOR HISTOCOMPATIBILITY COMPLEX because there are fewer CYTOTOXIC T LYMPHOCYTE precursors specific for the minor antigens. Typically, grafts transplanted across a single minor histocompatibility difference are rejected slowly, i.e., in more than three weeks, rather than one to two weeks for grafts transplanted across a single difference in the major histocompatibility complex. However, the effects of differences in minor antigens can be cumulative, so that many differences may result in rapid graft rejection. In contrast to products of the major histocompatibility complex, which can be recognized by T LYMPHOCYTES and serve as restricting elements in recognition of foreign antigens, minor histocompatibility antigens are recognized by T lymphocytes only in the context of major histocompatibility complex molecules. The molecular nature and function of the minor histocompatibility antigens are not known; they are probably membrane-bound and are usually present in a number of tissues. It is difficult to produce antibodies to minor histocompatibility antigens and they cannot usually be detected by serological assays. In contrast to the major histocompatibility complex-associated antigens, the minor antigens are not highly polymorphic (*see* POLYMORPHISM). *See* H-Y.

mitogen. Substance that induces mitosis of cells. As used by immunologists, the term refers to substances that induce TRANSFORMATION of diverse (polyclonal) lymphocytes. Some LECTINS (e.g., phytohemagglutinin) transform T LYMPHOCYTES; other lectins (e.g., pokeweed) transform both T and B LYMPHOCYTES. LIPOPOLYSACCHARIDES transform mouse, but not human, B lymphocytes.

mixed connective tissue disease. Disease in which patients have clinical features of SYSTEMIC LUPUS ERYTHEMATOSUS, SYSTEMIC SCLEROSIS and POLYMYOSITIS. Patients have high serum titers of ANTINUCLEAR ANTIBODY, with specificity for nuclear ribonucleoproteins.

mixed lymphocyte culture (MLC). *See* MIXED LYMPHOCYTE REACTION.

mixed lymphocyte reaction (MLR). Reaction that takes place upon culture of two sets of ALLOGENEIC leukocytes. The HELPER T LYMPHOCYTES (mouse or human CD4-bearing T cells) in either set recognize allogeneic CLASS II HISTOCOMPATIBILITY MOLECULES of the other set and undergo proliferation and differentiation, releasing a variety of LYMPHOKINES. In the 'one-way MLR', one set of cells is irradiated or treated with inhibitors of DNA synthesis and the cells therefore serve only as stimulators to the helper T lymphocytes in the other set. The mixed lymphocyte reaction is important in trans-

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plantation biology to study differences in histocompatibility antigens between donor and recipient. The degree of T cell proliferation, measured by the incorporation of [^{3}H]-thymidine into DNA gives an estimate of the degree of HISTOINCOMPATIBILITY.

MNSs blood group. ANTIGENIC DETERMINANTS of the glycophorins of human red blood cell membranes detected by ALLOANTIBODIES. Red blood cell membranes have two types of glycophorins: glycophorin A (M_r 31,000) and glycophorin B (M_r 11,000). Glycophorin A bears the M (serine at position 1 and glycine at position 5) or the N (leucine at position 1 and glutamic acid at position 5) ALLOANTIGENS. Glycophorin B bears the S (methionine at position 29) or the s (threonine at position 29) alloantigens. The *MN* alleles and *Ss* alleles are on chromosome 4 and are linked. ALLOIMMUNIZATION by MNSs alloantigens can cause HEMOLYTIC DISEASE OF THE NEWBORN.

molecular hybridization probe. Nucleic acid molecule that is made detectable by a labeling procedure (e.g., radiolabeling), and that is used to detect nucleic acid molecules of complementary sequence by molecular hybridization.

molecular mimicry. Sharing of an ANTIGENIC DETERMINANT by mammalian cells and microorganisms. For example, the M protein of streptococci shares antigenic determinants with membranes of human heart cells.

monoclonal. Related to or derived from a single CLONE.

monoclonal antibody. Antibody derived from a CLONE of B LYMPHOCYTES. Usually a monoclonal antibody is obtained from a B LYMPHOCYTE HYBRIDOMA, which is a clone from a single B lymphocyte that was fused with a myeloma cell. Monoclonal antibodies are therefore homogeneous in structure. These antibodies are useful in structural studies and immunoassays (e.g., amino acid sequence analysis of antibodies, identification of single antigens in complex mixtures, identification of cell surface molecules, and measurement of drugs and hormones). *See* MONOCLONAL IMMUNOGLOBULIN, POLYCLONAL ANTIBODIES.

monoclonal gammopathy. Presence in serum of a MONOCLONAL IMMUNOGLOBULIN (sometimes called 'M-component'), as in MULTIPLE MYELOMA, MACROGLOBULINEMIA OF WALDENSTRÖM, BENIGN MONOCLONAL GAMMOPATHY and certain other diseases.

monoclonal immunoglobulin. IMMUNOGLOBULIN that is the product of a CLONE of B LYMPHOCYTES or plasma cells (e.g., MYELOMA PROTEIN, MONOCLONAL ANTIBODY).

monocyte. Circulating immature cell of the MONONUCLEAR PHAGOCYTE lineage. Monocytes are considered to be more immature than MACROPHAGES because their cytoplasm contains fewer organelles and enzymes, their membranes have fewer receptors, and they are less active in pinocytosis.

monogamous bivalency. ANTIGEN–ANTIBODY COMPLEXES in which each BIVALENT antibody molecule combines with two determinant groups on a single antigen molecule or particle, rather than cross-linking two different antigen molecules or particles. Such monogamous binding requires that the antigens have repeating determinants that are suitably spaced to accommodate both Fab arms (*see* Fab FRAGMENT) of a single antibody molecule. If this requirement is met, binding of the first Fab arm places the second Fab arm in a favorable position for forming the second bond. The FUNCTIONAL AFFINITY of such interactions is very high; therefore, these binary complexes are extremely stable. A similar situation may occur if a single IgM antibody binds to several determinants on a multivalent antigen particle; this would be 'monogamous multivalency'.

monokine. Polypeptide, secreted by monocytes and macrophages, that affects the functions of other cells (e.g., INTERLEUKIN-1, TUMOR NECROSIS FACTOR). *See* LYMPHOKINE, CYTOKINE.

mononuclear phagocyte. Widely distributed cell characterized by its high rate of uptake of soluble and particulate materials (*see* PHAGOCYTOSIS). Mononuclear phagocytes derive from stem cells found in large numbers in the bone marrow and in other tissues. The young differentiated cells in this lineage are monocytes, which circulate in blood for 24–48 hours. The fully differentiated cells are macrophages, which are found